1. Histogram of an Image
2. Two images, *race.tif* and *kids.tif*, and their labeled histograms

A race car on a track

Description automatically generated

*Figure 1: race.tif*

Chart, logo, histogram

Description automatically generated

*Figure 2: Histogram of race.tif*

A group of children walking down a street with an umbrella

Description automatically generated with low confidence

*Figure 3: kids.tif*

Chart, histogram

Description automatically generated

*Figure 4: Histogram of kids.tif*

1. Histogram Equalization
2. Function *equalize()*:

Graphical user interface, text, application

Description automatically generated

*Figure 5: equalize() Function*

1. Labeled plot of for the image *kids.tif*

A picture containing icon

Description automatically generated

*Figure 6:*  *Plot for kids.tif*

1. Labeled plot of the equalized image’s histogram

Chart, histogram

Description automatically generated

*Figure 7: Equalized kids.tif Histogram*

1. Equalized image

A group of children walking down a street with an umbrella

Description automatically generated with low confidence

*Figure 8: Equalized kids.tif Image*

1. Contrast Stretching
2. Function *stretch()*:

Text

Description automatically generated

*Figure 9: stretch() Function*

1. Transformed image and its histogram

A group of children walking down a street with an umbrella

Description automatically generated with low confidence

*Figure 10: Transformed kids.tif Image*

Chart, histogram

Description automatically generated

*Figure 11: Transformed kids.tif Histogram*

1. Gamma
2. Setting the Black Level and Picture of Your Monitor

\* No Deliverables \*

1. Determining the Gamma of Your Computer Monitor
   1. Image corresponding to the matching gray level



*Figure 12: Image Corresponding to Matching Gray Level, g = 184*

* 1. Derivation of the expression which relates the matching gray level to the value of gamma
  2. Values of the measured gray level and the measured gamma

|  |  |
| --- | --- |
| **Measured Gray Level** | **Measured Gamma () Value** |
| 184 | 2.124 |

1. Gamma Correction
   1. Original and corrected images, with value of gamma used indicated in title

![A picture containing person

Description automatically generated]()

*Figure 13: Original linear.tif Image*

A picture containing person, dark

Description automatically generated

*Figure 14: Gamma Corrected linear.tif Image,*

* 1. Formula used to transform the original image
  2. Corrected image, properly labeled

![A picture containing person

Description automatically generated]()

*Figure 15: Original gamma15.tif Image*

A picture containing text, dark

Description automatically generated

*Figure 16: Corrected gamma15.tif Image*

* 1. Procedure used to change the gamma correction of the original image
     1. Transform pixel data back to un-corrected gamma state: Calculate y1 from x1, where x1 is the input data of image *gamma15.tif* and is the current gamma correction of the image

1. Re-correct for desired gamma value: calculate x2 from y1, where is the gamma correction value for the monitor being used

Solution: Apply a gamma correction of to the original data from *gamma15.tif*